



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
04.12.2002 Bulletin 2002/49

(51) Int Cl.7: **H04B 7/005, H04L 25/02**

(43) Date of publication A2:
05.01.2000 Bulletin 2000/01

(21) Application number: **99111988.4**

(22) Date of filing: **29.06.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
 Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
 • **Wheeler, David Andrew, Nec Technologies (UK)**
Reading, Berkshire RG2 0TD (GB)
 • **Hart, Joanna**
Reading Berkshire RG2 0AT, (GB)
 • **Truelove, Stephen**
West Midlands B73 5EL (GB)

(30) Priority: **30.06.1998 GB 9813985**

(71) Applicant: **NEC CORPORATION**
Tokyo (JP)

(74) Representative: **VOSSIUS & PARTNER**
Siebertstrasse 4
81675 München (DE)

(54) **Channel estimation device for digital telecommunications stations**

(57) The object of the present invention is to provide a channel estimation device which can provide a more accurate channel estimation in the interference and/or thermal noise than has been possible heretofore. A channel estimation device in accordance with the invention comprises a first estimator means operating to provide a time error estimate in accordance with the correlation between a central group of bits of a received training sequence with the corresponding bits of an expected training sequence, averaging means for averaging the signal corresponding to each bit of a first sub-group of

the bits of the training sequence with the signal corresponding to equivalent bit in a second sub-group of the bits of the training sequence, the first and second sub-groups of bits being expected to be identical, and second estimator means operating to recalculate the timing error estimate in accordance with the correlation between the same central group of bits in the received training sequence corrected by substituting the averaged signals for those contained in the received training sequence and the corresponding bits of the expected training sequence.

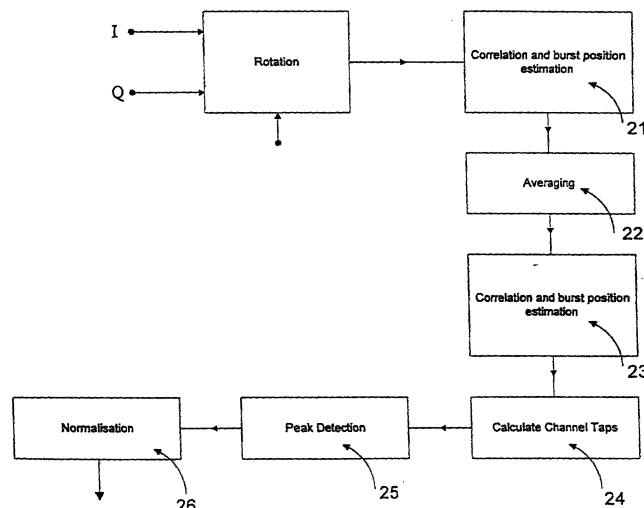


Figure 2



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 11 1988

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 701 334 A (NOKIA MOBILE PHONES LTD) 13 March 1996 (1996-03-13) * abstract; figures 2-5 * * page 2, line 41 - page 4, line 4 * ----	1-4	H04B7/005 H04L25/02
A	EP 0 534 399 A (AEG MOBILE COMMUNICATION) 31 March 1993 (1993-03-31) * page 2, line 29 - page 4, line 1 * ----	1-4	
A	WO 96 13910 A (ERICSSON TELEFON AB L M ;ERIKSSON PER OLOF (SE); ERICSSON LINUS (S) 9 May 1996 (1996-05-09) * page 1, line 7 - page 4, line 16 * ----	1-4	
A	US 5 479 446 A (MOUROT CHRISTOPHE) 26 December 1995 (1995-12-26) * abstract; figure 1 * * column 1, line 9 - column 2, line 39 * -----	1-4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H04B H04L
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 2 October 2002	Examiner Galli, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 11 1988

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-10-2002

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0701334	A	13-03-1996	FI	943803 A	19-02-1996
			EP	0701334 A2	13-03-1996
EP 0534399	A	31-03-1993	DE	4132200 A1	01-04-1993
			DE	59207709 D1	30-01-1997
			EP	0534399 A2	31-03-1993
WO 9613910	A	09-05-1996	SE	503522 C2	01-07-1996
			AU	695989 B2	27-08-1998
			AU	3861995 A	23-05-1996
			CN	1171176 A	21-01-1998
			DE	69527436 D1	22-08-2002
			EP	0789955 A1	20-08-1997
			FI	971827 A	26-06-1997
			JP	10508445 T	18-08-1998
			KR	256919 B1	15-05-2000
			SE	9403724 A	01-05-1996
			WO	9613910 A1	09-05-1996
			US	5903610 A	11-05-1999
US 5479446	A	26-12-1995	FR	2696604 A1	08-04-1994
			CA	2107816 A1	08-04-1994
			EP	0592294 A1	13-04-1994
			FI	934359 A	08-04-1994
			JP	6224791 A	12-08-1994